



Exploding Invasives!

How do aquatic invasive species impact native species and their natural habitat?

◆ **Grade Level(s)**

Middle School

◆ **Subject Areas**

Life Science, Environmental Science, Ecology, and Human Impacts

◆ **Key Topics**

Aquatic Invasive Species, Habitats, Competitive Relationships in Ecosystems

◆ **Duration**

Preparation Time: 10 min
Activity Time: 15 min

◆ **Setting**

Outside or Classroom (Groups)

◆ **Skills**

Analyzing, Interpreting, Applying Knowledge

◆ **Standards**

NGSS & MT Science Std.:

MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resources availability on organisms and populations of organisms in an ecosystem.

LS2.A: Interdependent Relationships in Ecosystems
CROSSCUTTING CONCEPT(S):

Cause and Effect, Sustainability and Change, Patterns

SCIENTIFIC & ENGINEERING

PRACTICE(S): Analyzing and Interpreting Data

Overview

Students will be introduced to what aquatic invasive species (AIS) are and their impact. They will learn, through a physical game, how aquatic invasive species impact native species by competing for resources and changing natural habitats.

Objectives

Students will be able to:

- define aquatic invasive species.
- name at least three aquatic invasive species in Montana.
- describe how an aquatic invasive species can impact native species and their natural habitat.

Materials

Activity

- Native/Invasive Habitat Cards
- Orange Cards
- A music playing device with a song preloaded
 - (Song example: ‘Stayin’ Alive by the Bee Gees)
- A whiteboard or piece of chart paper
- Two different colored markers

Advanced Preparation

- Make arrangements to reserve and pick up the Mussel Walk Trunk with the materials above from FLBS.
 - Call (406) 872-4500 or make a request on the FLBS website: <https://flbs.umt.edu/newflbs/outreach/k-12-education/>
- Prior to the activity, set out the Native/Invasive Habitat cards in a circle as placeholders for the students to stand by (these cards represent the ‘chairs’ of musical chairs.)
- Prepare a large graph by drawing the x & y axis on chart paper or a white board. You will plot native and invasive species after each round on this graph.
- Make sure your music playing device is charged, the song is preloaded, and the speakers work.



**FLATHEAD LAKE
BIO STATION**
UNIVERSITY OF MONTANA

© 2019 AIS Unit created by the Flathead Lake Biological Station and the Flathead Lakers. Funded by the Montana Department of Natural Resources and Conservation, FLBS, and Flathead Lakers.



Clean, Drain, Dry Challenge

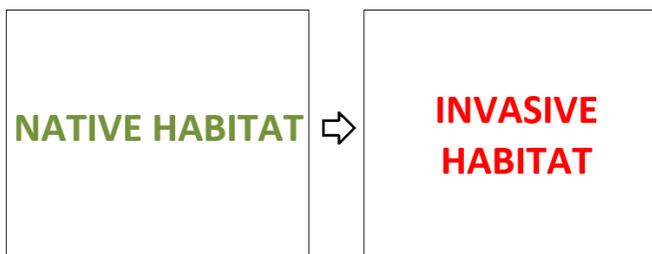
Procedure

◆ Warm Up (2 minutes)

- Have the students stand in a circle by a Native/Invasive Habitat Card, previously placed in a circle.
- Explain to students that aquatic invasive species are a threat to native species in an ecosystem.
- Ask students to define “aquatic invasive species”.
 - Ask 1-2 students to share their definition of an aquatic invasive species.
 - Aquatic Invasive Species definition: Aquatic, non-native species that cause economic or environmental harm.
- Ask students to name three examples of aquatic invasive species in Montana.
 - Examples: Zebra Mussels, Quagga Mussels, Lake Trout, Rainbow Trout, Flowering Rush, Curly Leaf Pond Weed, Eurasian Watermilfoil, American Bullfrog, etc.
 - (More examples at: <https://www.invasivespeciesinfo.gov/aquatic-invasives>)
- Tell the students that they will be playing a game similar to musical chairs to demonstrate what can happen to native species when aquatic invasive species (AIS) arrive.

◆ The Activity (8 minutes)

- Have the students form a circle, standing at a habitat place holder.
- Explain to students that they are each a native fish living in a small lake near town. Each square on the floor represents their habitat with all the food, space, and resources they need to survive. Up until this point they have been the only fish in the lake, until an aquatic invasive fish is introduced.
 - **ROUND 1:** Select 1-3 students (depending on how large your group is) and have them become the AIS that gets introduced.
 - These students will then flip their habitat cards over from **NATIVE HABITAT** to **INVASIVE HABITAT**.
 - Give each student who is now an invasive an orange card so they can be easily identified from the students representing the native species.
 - This will help students visually see the native population decreasing and the invasive species increasing.



An example of what the Habitat Cards look like. These cards are available for use in the Mussel Walk trunk and below in the resources section for printing if not borrowing the trunk.

Rules for Each Round: (ROUND 2 AND BEYOND)

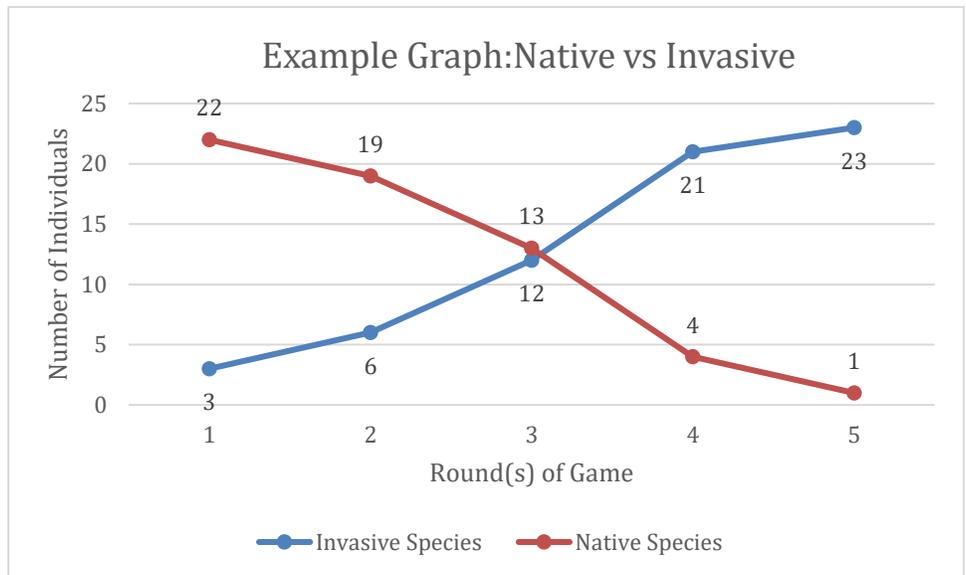
1. Round starts when the music starts, students walk safely around the circle in one direction.
 2. Students stop walking and stand by the habitat nearest them when the music stops.
***Note: Unlike “Musical Chairs”, habitat spaces are never lost, every student will have a place to stand for every round.**
 3. Native species that land on a native habitat space survive and stay native.
 4. Native species that land on an invasive habitat space cannot survive there, they become resources for the invasive and turn into an invasive species.
 5. Invasive species who land on a native habitat space change it to an invasive habitat, flip the card.
- At the end of each round:
 - Record the number of **INVASIVES** and **NATIVES** on the whiteboard or chart paper (See example on the next page).
 - Hand out orange cards to any new invasive at the end of each round.
 - Play until there is one or a few native species left depending on group size.



Clean, Drain, Dry Challenge

◆ Wrap Up (5 minutes)

- Have the students flip the habitat placeholders back to the **NATIVE** side.
- Bring students together and have them hand back the orange cards.
- Plot the invasive and native species on the graph (see example)
- Have the students look at the graph and ask:
 - How did the total population of native and invasive species change over time? (**Invasive species eventually become the dominant population because (1) the invasive species can ADAPT to their own and the native habitat (2) native species would get eaten or outcompeted for resources by the invasive species if they entered their habitat.**)
 - Why did the invasive species continue to grow exponentially? (**They have no natural predators.**)
- Talk about aquatic invasive species management efforts, particularly Clean, Drain, Dry.
- Hand out poster or prize item to the winner (last remaining native species).



Extensions

To extend the game, you can talk about different ways people can intervene to manage AIS. One way we can manage invasive fish is by removing them with techniques such as electrofishing, gill netting, or fishing tournaments (such as Mack Days on Flathead Lake). Before playing, tell the students that at the end of each round you will electrofish and remove 3-5 invasive fish (depending on group size and time). Once removed, their habitat space will become native again. Continue playing the game and compare the new graph with the original graph.

Students can also:

- **graph** the data from the game back in the classroom.
- **research** an Aquatic Invasive Species in Montana and see how it is effecting native species populations.
- **teach** other students at their school this activity to practice their knowledge about aquatic invasive species.

Resources

DeYonge, Sandra, et al. *Project WET: Curriculum and Activity Guide 2.0*. Project WET Foundation, 2011.

Acknowledgements

Many thanks to Natalie Poremba for providing adaptation feedback for this lesson from ProjectWET and Monica Elser for editing.



Photo credit: Holly Church

Students listening at the 2019 CSKT Mussel Walk annual event at Salish Point.



FLATHEAD LAKE
BIO STATION
UNIVERSITY OF MONTANA

© 2019 AIS Unit created by the Flathead Lake Biological Station and the Flathead Lakers. Funded by the Montana Department of Natural Resources and Conservation, FLBS, and Flathead Lakers.



Clean, Drain, Dry Challenge

This page intentionally left blank.



FLATHEAD LAKE
BIO STATION
UNIVERSITY OF MONTANA

© 2019 AIS Unit created by the Flathead Lake Biological Station and the Flathead Lakers. Funded by the Montana Department of Natural Resources and Conservation, FLBS, and Flathead Lakers.



NATIVE HABITAT

NATIVE HABITAT

NATIVE HABITAT

NATIVE HABITAT

INVASIVE HABITAT

INVASIVE HABITAT

INVASIVE HABITAT

INVASIVE HABITAT

